

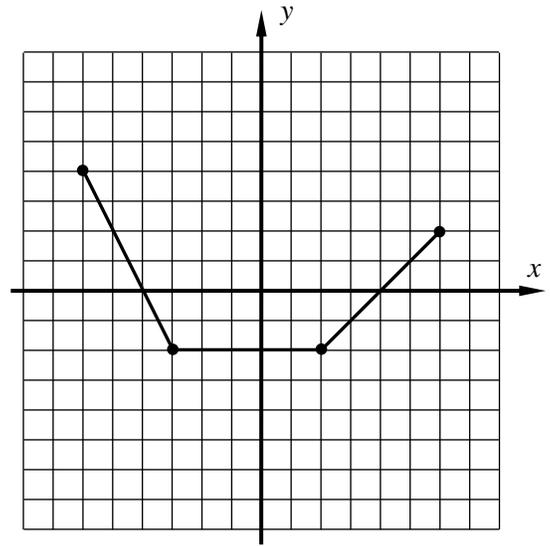
2-4 HORIZONTAL STRETCHING OF FUNCTIONS

FLUENCY

1. The function $f(x)$ is shown graphed on the axes below with selected points highlighted. Two additional functions are defined as:

$$g(x) = f(2x) \quad \text{and} \quad h(x) = 2f(x)$$

Graph both $g(x)$ and $h(x)$ on the same grid and label them.



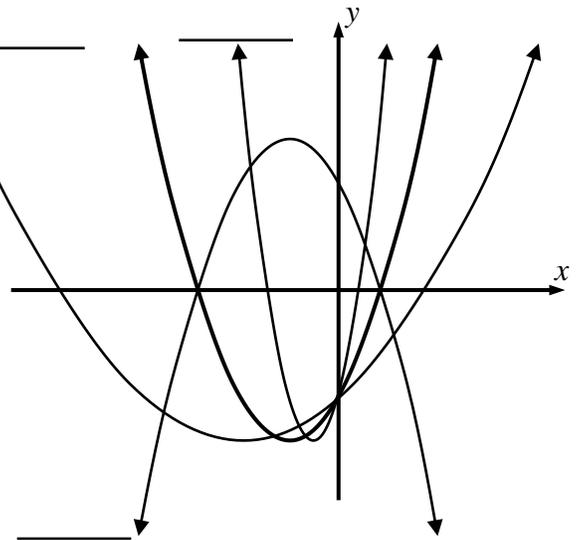
State the domain of $g(x)$ only:

2. The quadratic function $f(x)$ is shown graphed to the right. Three other functions are defined below with equations based on $f(x)$. Label each graph with its appropriate function.

$$g(x) = -f(x)$$

$$h(x) = f(2x)$$

$$k(x) = f\left(\frac{1}{2}x\right)$$



3. Which of the following formulas would indicate that the graph of $h(x)$ was stretched in the horizontal direction by a factor of 3?

(1) $h(3x)$

(3) $h(x)+3$

(2) $h\left(\frac{1}{3}x\right)$

(4) $3h(x)$

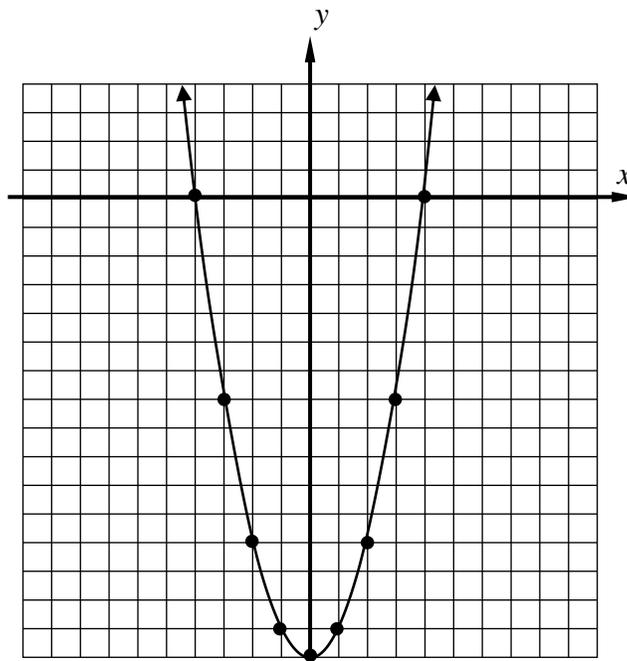
4. The parabola $f(x) = x^2 - 16$ is shown graphed on the grid below with certain points highlighted. The function $g(x)$ is given by $g(x) = f(2x)$.

(a) What is the range of the function $f(x)$?

(b) State the zeroes of $f(x)$.

(c) The function $g(x)$ will have the equation $g(x) = (2x)^2 - 16$. Using your calculator, create a graph of $g(x)$ on the grid given.

(d) State the zeroes of $g(x)$. Why does this answer make sense in light of (b)?



REASONING

5. The function $f(x)$ is shown below. Another function is defined by the formula:

$$g(x) = f(2x) + 3$$

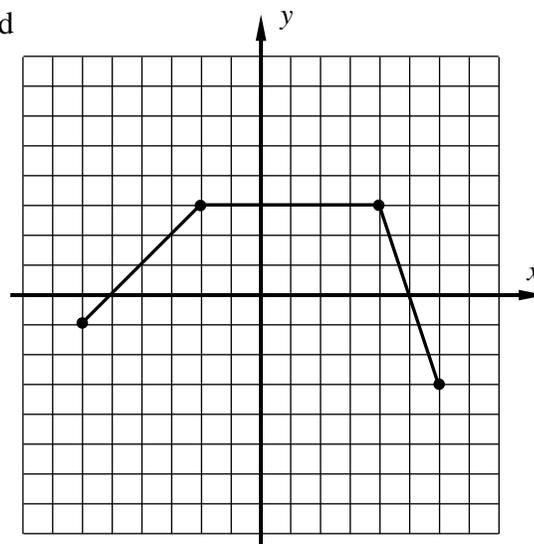
(a) Evaluate each of the following. Show your work.

$$g(-3) =$$

$$g(-1) =$$

$$g(2) =$$

$$g(3) =$$



(b) Plot a graph of $g(x)$ based on (a).

(c) What two transformations occurred to the graph of $f(x)$ to produce the graph of $g(x)$? State them and their order.